Vision Based Non-Cooperative Satellite Capture

Objective

The objective of this research is to design a vision based navigation and guidance sensor system to capture non-cooperative satellites by developing the ability to use single or multiple cameras to determine the position and orientation of a target for vehicle navigation and capture. The vision system comprised of cameras and a processor will be used to determine three-dimensional attitude and relative position information. Various segmentation techniques will be investigated for proper segmentation of satellites in dynamic lighting conditions. Optical flow may be used to map the velocity vector of the satellite and to isolate the satellite. Issues dealing with translation, rotation, and scaling will also be investigated.

Why Needed

The project is viewed to have a tremendous potential for servicing non-functioning satellites. Other benefits include improving reconfigurable system technology, field programmable gate array (FPGA) technology, digital signal processing (DSP) design and development, and VHDL language/architecture development tools.

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Sponsor

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